

GALLS ON ABOVEGROUND PLANT PARTS CAUSED BY ROOT-KNOT NEMATODES.

P. S. Lehman¹

Plant parasitic nematodes in the genera Anguina, Aphelenchoides, Bursaphelenchus, Ditylenchus, Nothanguina, Orrina, and Radinaphelenchus, parasitize primarily aboveground plant parts. Although different species of Meloidogyne cause galls primarily on the roots, they are also known to naturally infect and cause galls on stems, leaves, or flowers in 16 genera of plants (Table 1). Root-knot nematodes likely have the potential to naturally infect aboveground plant parts of a wider range of hosts than those listed in Table 1. This is based on the fact that species of Meloidogyne have been shown to reproduce and cause galls on the leaves and stems of the following additional hosts that were artificially inoculated: Ananas comosus L. (pineapple), Begonia coccinea Hook. (angelwing begonia), Coleus blumei Benth. (coleus), Emilia sonchifolia L. (a composite), Hibiscus rosa-sinensis L. (Chinese hibiscus), Impatiens balsamina L. (balsam), Nicotiana tabacum L. (tobacco), and Portulaca oleracea L. (purslane) (7,9,11,13).

The aboveground part of plants most frequently infected by species of Meloidogyne is the stem. As early as 1934 it was observed that root-knot nematodes caused galls on the stems of several hosts (15). Stem galls usually result from natural infection of the hypocotyl and cotyledons by the nematodes prior to seedling emergence from the soil (2,16,18). As the developing seedlings emerge and expand, the root-knot nematode juveniles in the infected tissue are carried above the soil line and cause galls on the stems. Leaf galls caused by species of Meloidogyne have been reported less frequently than stem galls. Severe infection of leaves may result in chlorosis, crinkling, and abnormal leaf shape and size (3,6,7,8,12). Root-knot nematode is known to produce galls, and complete its life cycle on the flower parts or inflorescence of only one host, Palisota barteri (6,8).

Histopathological studies of stem and leaf galls on a number of different hosts indicate that giant cell formation and the basic pattern of cellular changes that occur in stems and leaves are similar to those that occur in roots infected with species of Meloidogyne (2,7,12,17,19). Several researchers have investigated whether the susceptibility or resistance of roots to species of Meloidogyne is correlated with stem susceptibility or resistance. These studies indicate that this is true in tomato and tobacco, but not in bean (2,13,14).

Table 1. Hosts on which Meloidogyne species caused galls on aboveground plant parts following natural infection

Nematode/Host	Plant part(s) with galls	Reference(s)
<u>Meloidogyne</u> sp.		
<u>Begonia</u> sp.	stem	15
<u>Glycine max</u> L. (soybean)	stem	*
<u>Hibiscus esculentus</u> L. (okra)	stem	7
<u>Lycopersicon esculentum</u> Mill. (tomato)	stem	17
<u>Luffa acutangula</u> (L.) Roxb. (ridged gourd)	stem	4
<u>Phaseolus limensis</u> Macfady (lima bean)	stem	18
<u>Phaseolus vulgaris</u> L. (bean)	stem	16
<u>Rheum rhabararum</u> L. (rhubarb)	stem	15
<u>Thunbergia laurifolia</u> Lindl.	stem	15
<u>Vigna unguiculata</u> (L.) Walp. (cowpea)	stem	17
<u>Meloidogyne arenaria</u>		
<u>Saintpaulia ionantha</u> Wendl. (African violet)	petiole & leaf	3
<u>Meloidogyne incognita</u>		
<u>Begonia</u> X <u>semperflorens-cultorum</u> Hort.	stem & shoots	5
<u>Euphorbia mamillaris</u> L. (corkscrew)	stem & shoots	5
<u>Hibiscus sabdariffa</u> L. (roselle)	stem	17
<u>Luffa acutangula</u> (L.) Roxb. (ridged gourd)	stem	10
<u>Phaseolus vulgaris</u> L. (bean)	stem	2
<u>Siderasis fuscata</u> (Lodd.) H. E. Moore	petiole & leaf	12
<u>Meloidogyne javanica</u>		
<u>Cucurbita maxima</u> Duchesne (pumpkin)	stem	10
<u>Hibiscus sabdariffa</u> L. (roselle)	stem	17
<u>Lagenaria sicernaria</u> (Mol.) Handl.	stem	10
<u>Palisota barteri</u> Hook. f.	petiole, leaves & flowers	6, 8

* Personal observation by author

¹Nematologist, Bureau of Nematology, P.O. Box 1269, Gainesville, FL 32602

Survey and Detection:

Species of Meloidogyne typically produce root galls on susceptible plants, but for regulatory and survey purposes, aboveground plant parts also should be examined for root-knot nematodes. On some hosts, root-knot nematodes have been observed in tissue infected with crown gall bacteria, Agrobacterium tumefaciens (E. F. Sm. & Town.) Conn (1).

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